The RARS Exciter

Issue 274, January 1993 - Club Repeaters: 146.64 -, 147.57, 224.64 -, 444.5+, 444.95+

Amateur Television In The Triangle

By Woody Winstead, KJ4SO

In mid September, following the SAREX mission, I began running tests with several local hams and Larry, NN4H in Durham using the ATV transceiver that Ken, N4ZBB had obtained on loan from AEA Electronics. I made several one-way contacts with local hams who were using cable ready TV sets, VCR receivers, or CATV downconverters to receive my transmissions on cable channels 59 & 60 as well as a one-way contact with NN4H. I had a great time, and the activity generated a lot of interest in ATV.

The AEA unit worked very well, but it was only capable of 1 watt PEP output which was insufficient to drive my Mirage D1010 "brick" to a reasonable level. Also, the unit was on loan and it had to be returned to AEA. AEA sells a companion 50 W PEP mast-mountable power amp/receiver preamp with a 28 VDC power supply for $699. I decided that I wanted to buy an ATV transceiver capable of driving a 100 watt amplifier, preferably the Mirage D1010 that I already owned. I talked to several people who were familiar with ATV, read all the articles on ATV that I could find in back issues of the ARRL "HandBook" and QST, and I reviewed product literature from AEA and PC Electronics.

I decided that the PC Electronics TC70-10 70 cm (420 - 440 MHz,) 10 watt transceiver best suited my requirements. This unit sells for $499 equipped with one crystal plus $15 for a second crystal. There are only five ARRL band plan ATV frequencies available in the 70 cm band, so ATV transceivers are usually crystal controlled. PC Electronics offers a 10% discount for group orders of 5 - 24 pieces and a 15% discount for 25 pieces or more of the same unit. This applies to either complete transceivers, or any of the various modules, antennas, or power amps that they sell.

After talking to several other hams in the area, seven of us placed a bulk order for the TC70-10 transceivers in November. This first group includes myself - KJ4SO, Brian - KD4BFJ, Ed - WA4PEN, Wilbur - WD4RDT, & Tom - N4IZE from Raleigh and Charlie - WA4WTX, & John - KB4WGA from Durham.

Brian, KD4BFJ and I made the first (as far as we know) 2-way ATV contact in the Raleigh area a few weeks ago. The PC Electronics transceiver works great. It looks very good inside, and out, and we are both very pleased with the design and performance of the unit.

I met with several hams after the regular monthly RARS meeting in October to discuss the possibility of putting together a group to fund the construction of an ATV repeater. My goal is to fund the repeater primarily through annual user support fees and donations. This would have been very

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The Raleigh Amateur Radio Society, Inc. (RARS), founded in 1969, has grown to be one of the premier radio clubs in North Carolina. Current membership is around 400.

The objectives of the club are to promote world wide friendship through Amateur Radio; to be of public service by providing radio communication in times of disaster, emergency, or civic need; to educate members in radio technique, and to assist in obtaining Amateur Radio licenses.

All persons interested in Amateur Radio, currently licensed or not, are eligible to apply for membership to the club.

Dues to the club are $18.00 per year (which runs from July 1 to June 30). Applications for membership may be obtained from any of the officers named below; from the newsletter editor, named on the facing column; or at any RARS Meeting.

Club meetings are held the first Wednesday of every month, 7:30 PM, at the Raleigh YMCA, 1601 Hillsborough St.

In addition to the many social and special events, the club sponsors a 2 m repeater, W4DW, on 146.04/64 MHz. The club also sponsors repeaters on 223.04 / 224.64 MHz, 444.5 / 449.5 MHz, 444.95 / 449.95 MHz and a packet cluster node on 147.57 MHz. All repeaters cover Raleigh, and most of the surrounding Wake County area. Auto-patch privileges are available on W4DW to duly licensed RARS members.

1992Officers:

President:	Walter Price, KM4BU 420 Oak Ridge Cary, NC 27511 481-3856
Vice President:	Rick Merkle , KA3PSK 6412 Sassafras Lane Raleigh, NC 27614 870-8268
Secretary:	Liz White, KO4CK PO Box 13315 RTP, NC 27709 481-2874
Treasurer:	Mike Murphy, WA4BPJ 7329 Barberry Court Raleigh, NC 27615 847-4641

The EXCITER is published monthly by the Raleigh Amateur Radio Society, and is mailed at no cost to its members.

Letters to the Editor, technical articles, items of interest to the ham community and guest editorials are actively solicited.

Any article published in the EXCITER does not necessarily represent the views of, the Officers, Board of Directors, Editor, or Society Membership, nor does publication thereof represent concurrence by the Officers, Board of Directors, Editor, or Society membership with the contents of the article.

Articles will be printed at the discretion of the Editor, and no article will be published unless it is accompanied by the name(s) of the person(s) submitting the article.

All copy must be in the hands of the editor by the end of the Board of Director's meeting on the third Wednesday of each month. Articles submitted for publication may be hand or type written, an ASCII file on disk transmitted electronically via telephone modem, or on the ham bands using PACKET.

Ham related items for sale by the members will be advertised without charge for one issue, but may be re-submitted as often as desired. These ads must be non-commercial in nature.

Commercial ads will be run in return for the following donations to the club:

	Single Issue	Full Year
Business Card	$7.50	$75.00
Quarter Page	$11.25	$112.50
Third Page	$15.00	$150.00
Half Page	$22.50	$225.00
Full Page	$50.00	N/A

(Commercial ads must be of "camera-ready quality," and obviously can not be sent via ham bands.) Due to the reprographic process used, no color copy can be accepted.

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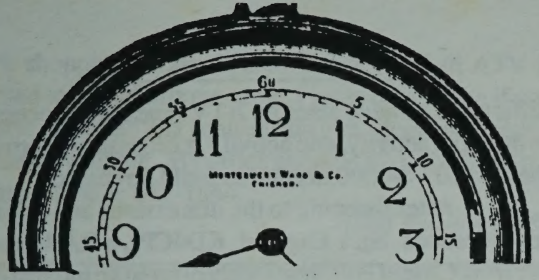
SPECIAL SERVICE CLUB ARRL

Young Ladies' Radio League

AMSAT

SOUTHEASTERN REPEATER ASSOCIATION MEMBER



MINUTES OF THE MEETING

Board Meeting, November 18, 1992

The monthly board meeting of the Raleigh Amateur Radio Society was held at the YMCA on Hillsborough St. The meeting was called to order by KM4BU at 7:03. Members present at that time: KN4BS, KO4CK, KB4MDZ, WA4MJF, KD4OKQ, WA4PEN, KC4UPX. Late: N4BYO, K4HF, KA3PSK. Excused: KN4AQ. Absent: KC4UQO, AA4MY.

Motion by WA4MJF with second by WA4PEN to accept the minutes of the October board meeting. None opposed.

KC4UPX presented the Treasurer's Report. Nothing has changed from the meeting presentation. We have been advised that the CDs for the RARS investment account are not paying well and a money market account would pay more. This would be acceptable according to the by-laws as long as the funds are fully insured by an agency of the Federal Government. Bernard will check to see that this meets the spirit of the by-laws. Edward Breeden who manages the account for RARS will be taking a leave of absence and someone else will handle the account in his absence. Membership is now up to 397. If board members hear of roster problems from members, please find out what they are and let Bernard know so that corrections can be made. One problem is that members who joined in October have not received an Exciter. This is due to the November Exciter being mailed early. If these individuals do not receive a December Exciter, then Bernard should be notified.

Labels for the next three mailings of the Exciter have been made and KN4BS plans to send the December issue first class. This will hopefully solve some of the problems.

KC4UPX noted that Chesley McDougal has become a silent key. N4IQA gave Mike information to put in the Exciter about this.

WA4MJF introduced N4VQN Bob Rinn who presented some figures on the upcoming RARSFest anticipated expenses and revenue. A copy of the proposed budget was given to the officers. Based on prior years, N4VQN and K4HF, working independently, came up with figures that were very close. Projected income 25,100 (24,592 K4HF), expenses 15,920 and net revenue 9,180 - down from last year (10,300). This is a conservative estimate. Last year's projected income was also lower than actual. Bulk of the expense are for prizes and building & facilities. Those in charge of various areas are: K4HF-pre-hamfest, KD4BFJ- Administration and KO4TV-Operations.

KD4OKQ reported on the astronaut progress. She has been trying to contact Central Office. Feedback has been positive. Once the money and approval is received, it will be a minimum of six weeks before the date can be scheduled and it will be at NASA's discretion.

KM4BU reported on the auction. Perceptions: Number of items reduced from the past. Seemed to go well. Projected to make about $100. Netted out a little less than that. One member returned check to be split 50/50 between UHF/VHF SIG and the Club.

KA3PSK said Carl Ebhart provided a service to the Club in allowing his station to be used for the SAREX mission. Motion by KA3PSK to give Carl a one-year membership to RARS in recognition of this service. Second by KD4OKQ. Amendment changed to read full year plus the remainder of this year. Discussion that perhaps a plaque would be better - given at the awards banquet. Motion carried 6 for, 2 opposed to give the membership.

KM4BU reported that the tax exempt status is going forward. Sam Johnson has sent 2 letters in regard to our non-profit status. An application for recognition as tax exempt has been received and N4BYO is working on getting the information.

KA3PSK said he needs help getting refreshments for the board meetings - starting the coffee and bring ice. WA4BPJ will start the coffee and KD4BFJ volunteered to get the ice for the next meeting. He also plans to ask the Crystals for help with decorations for the Christmas party. Any ideas or suggestions would be welcome.

KA3PSK reported he had a donation of 5 9600-baud modems. He is testing them now. New BBS software is running pretty well.

KD4OKQ requested that KD4OKR assume her board seat. No board action required since they are serving as co-chairs and it was at their discretion who would actually be the spokesperson.

KO4CK reported that she had been phoning former members who chose not to renew. One thing she felt was that RARS needs to get back to remembering to be more personal in dealing with others - especially those who are new to the club.

KM4BU talked with KM4LB of the Cary Club. They are thinking about having a program in the September/October time frame which would be "Hamily Feud". This could be interesting to the Cary Club and to RARS. Get in touch with Walter if you have further interest.

KA3PSK would like to design some kind of questionnaire on members' interests in the club and opinions on RARS.

WA4PEN disagreed with sending out questionnaires, but did agree that we need more of the personal touch. He spoke of the interest in ATV. He mentioned that quite a few transceivers have been purchased for it already.

KB4MDZ said the open patch is working fine. It was thought at one time that the tower where .64 and .95 are located would be in the path of the proposed outer loop. Chuck has received word from the owners of the tower that the road will go north of the tower. Chuk's idea about people feeling that RARS does not meet their needs was that these folks should get together and start a SIG that addresses their specific interests. That is the purpose of SIGS.

KC4UPX handed out some maps of Raleigh he picked up when he was working with the Red Cross at the fair. It has the major streets shown. He felt it might help at the upcoming RARSFest.

N4BYO reported on the tax exempt status. He received a packet of forms (37 of them) to be filled out and submitted. He asked for help in gathering information for the various forms. If board members would take a form or two; research the form and find the answers, it would cut the preparation time way down. In glancing through the forms, he found nothing that should keep RARS from gaining tax exempt status. He needs to get the information about whether RARS has filed income tax returns and if not if there are letters to that effect in the files.

KD4OKR reported on some ideas for Field Day. This

coming field day is the 60th. Bob Keys plans to set up old equipment for a nostalgia station. Would like to have everything from the very old stuff to satellite and possibly ATV. The idea being to show off amateur radio from CW to satellite. It will be at Umstead Park. Power should not be a problem because there is a good possibility of having a generator truck. A pig picking is planned which may be open to the public for a fee. This would allow time to show off all modes during the day and have the evening to concentrate on serious contesting. Another thought is to try to qualify for the 18-Alpha category. This would be a one-time only thing. To meet that class it is not necessary to operate all transmitters constantly. Since this would be such a drastic change, KD4OKR wanted to know if this was something that the board would support. It is going to take a lot of advance planning, so a decision is needed. These are ideas to kick around. Mike has researched past QSTs for contest scores by class and he feels we would have a very good chance of winning. No objections were raised.

N4VQN mentioned that we are out of certificates for the awards presentations. This should not be left to the last minute.

N4YRD John commented on the concerns regarding membership. He said that this is not an unusual situation and maybe it really is not a major problem. Clubs all over the country experience this.

WA4MJF said that the VHF/UHF SIG will be participating in the VHF/UHF QSO party the second weekend in January at ABB. K4SAN is the contact person if you want to operate in it. Ronnie feels that something needs to be done to evaluate whether the evening net should remain a traffic net. If it does, there should be more traffic and training on how to pass traffic. He said that it looks like in the future the FCC will authorize club calls, etc. The ARRL supports bringing novice testing under the VE system.

Motion by KB4MDZ to adjourn. None opposed. Meeting adjourned at 9:37.

Liz White, KO4CK

December Club Meeting

The regular meeting of the Raleigh Amateur Radio Society was held December 2, 1992 at the YMCA on Hillsborough Street. The meeting consisted of the annual RARS Christmas party. After everyone had eaten, Walter KM4BU conducted a short business session.

Ed WA4PEN installed the following officers and board members:

Rick Merkle KA3PSK - Vice President
Mike Murphy WA4BPJ - Treasurer
Gary Pierce KN4AQ - Publicity
Jim DuBreck N4BYO - Training Director
Doug Sweet KC4UPZ - Public Service
Chuck Littlewood K4HF - ARRL Liaison

With no other business to conduct, the party continued with a guest appearance by Santa Claus. Door prizes were given and with the amount of food, no one should have gone away hungry!

Liz White KO4CK, Secretary

ATV continued from Page 1

difficult to achieve since an ATV repeater is necessary to promote activity, and activity is necessary to provide the $3,000 - $4,000 needed to build a repeater.

After listening to the discussions and asking a few questions, Nick England, KD4CPL a RARS member from Chapel Hill, graciously offered an interest-free loan of $3,000 - $4,000 to build the repeater. His investment will be repaid over the first three years of operation from user support fees and donations. With sufficient members, I would like to try and keep annual user support fees down to approximately $25.

Charlie, WA4WTX has offered to provide a tower location, a rack cabinet, and approximately 170 feet of 7/8" heliax for the repeater. After running tests from a tower located on Red Mountain near Rougemont and looking at other sites that were available, Charlie and I have decided to locate the repeater at his new tower site located near the intersection of Glover Rd. and Miami Blvd. in RTP. Ground elevation is 400' MSL, tower height is 180', and the ATV antenna will be located approximately at the 160' level. The tower coordinates are 35 deg., 57 min., 22 sec. and 78 deg., 51 min., 15 sec. if you would like to plot the location on a topo map.

I have talked to Danny Hampton, KM4OX and I will be submitting paperwork to SERA for coordination of the ATV repeater with an input frequency of 434.0 MHz. (cable channel 59) and an output frequency of 421.25 MHz. (cable channel 57). I selected these frequencies to minimize the possibility of interference to, or from, local 440 MHz. FM repeaters.

After talking with the RARS Board of Directors, several RARS members, and Charlie - WA4WTX from the Durham FM Association, I have decided to try to form an independent association of RARS and DFMA members, as well as any other interested hams in the Triangle area, to fund, build, and operate an ATV repeater.

I have scheduled a meeting for January 14, 1993 at 6:30 p.m. to meet with all interested hams in the Triangle area for the purpose of forming the ***Triangle ATV Association.*** This meeting will be held at the *Darryl's* restaurant (upstairs in the "Jail") located on Hwy. 70 W next to *McDonalds* and across from the Oak

Park shopping center. Anyone interested in ATV is invited to attend this meeting. Please contact me if you plan to attend so that I can ensure that adequate meeting space is available. My office phone is 870-1044, and my home phone is 848-1844.

Woody Winstead, KJ4SO

AMATEUR TELEVISION OVERVIEW

I have been asked many questions concerning ATV during the past month. The most knowledgeable person on the subject of ATV that I have found is Tom O'Hara, W6ORG, the owner of PC Electronics and the author of many fine articles on ATV. The following information is comprised of partial excerpts from documents provided by Tom and is reprinted with permission.

ANTENNA SYSTEMS

The antenna system is the most important part of your ATV system. Trees, foliage, houses, etc. greatly absorb UHF energy. Compared to FM voice systems with the same power, antenna, etc. just the system bandwidth going from 15 KHz to 3 MHz in the receiver will decrease your sensitivity 26 dB. With this bandwidth the noise floor is around .8 pV. So you can see quality coax and high gain antennas up as high as possible are necessary to make up this difference compared to the DX you are used to with FM simplex.

Antennas for ATV work must also have broad bandwidth as well as gain. Most high gain Yagi types have only 1% bandwidth, or 4 MHz at 70 cm. This will give less gain and higher VSWR to the most important color and sound subcarriers assuming that the antenna was cut for the exact video carrier frequency in the first place. The best true reference for antenna gains and performance is the results of the various VHF/UHF Conferences antenna measuring contests held annually and publicized in the ham magazines. Advertising claims have become mostly wishful thinking and hype.

Some beams that have proven out on ATV over the years are the KLM 4406x, 10x, and 27. All are designed to be broadband with good gain. The 6 element antenna is only 28" long, end mounted, but has 8.9 dBd gain. The 10 element is similar with 64" boom and 11 dBd gain. The 27 element is center mounted and 14 dBd gain with a 12' boom length. The KLM435 18C is a circularly polarized beam with 12 dBd gain on an end mounted 7.3' boom. Circular polarization lets you work all modes & antenna polarities plus has the added advantage of less multipath dropouts and ghosts than a fixed polarity.

ANTENNA CABLE

Use only new or tested low loss coax that has at least 95% shielding. We suggest Belden 8214 (3.8 dB/100' loss) or 9913 (2.5 dB loss at 400 MHz). RG 213 or 214 is fine but has a loss of 4.7 dB/100'. (see note #1, editor) For runs over 100' you may want to consider investing in some good copper hard line or antenna mounted low noise preamp such as the Advanced Receiver Research MM432VDG or MML432VDG. An antenna mounted preamp can increase receive sensitivity by an amount equal to the coax loss.

Use type N connectors for all outside coax connections. Take care to properly put them on the cable. Prevent moisture contamination of the coax by wrapping all connections with two layers of vinyl tape. Coax Seal is also good. Then spray all connections and antenna with clear epoxy paint. Colored paint may have conductive particles in them that will affect the antenna gain or match or give intermods. Moisture in the coax results in increased loss and greater possible intermod interference. If moisture contamination is suspected, peal back the braid and look to see if it is still bright. If it is oxidized, replace it. VSWR will actually look better with the higher loss from moisture contamination.

"What kind of distance can I expect? This the most asked question. There is no pat answer because of all the variables. But for a practical snow free picture with a 42 dB sync to noise ratio it is 22 miles. This is based on line of sight, KLM 44027 beams, 3 dB coax loss, and either the TC701 , TX701 or KPA5 1 watt transmitter.

For greater DX most of your time and effort should be in the antenna system, bigger antenna, lower loss coax, greater antenna height. This will improve both transmit and receive conditions. DX will double for every 6 dB of change. Antenna placement should be away from and above trees and roof tops. The RF

horizon on flat terrain for an antenna at 50' above ground is 10 miles. Foliage greatly absorbs 70 cm energy. You can experience non-line-of-sight DX depending on reflections, temperature inversion skip, and use of ATV repeaters

DX vs. POWER vs. ANTENNA GAIN

While it is almost impossible to predict actual ATV DX due to different terrain and conditions, the line of sight snow free picture distance can be calculated given all the controllable factors. We must know the transmitter peak envelope power (p.e.p. sync tip), coax loss, and antenna gain over a dipole. At the receive end, we must also know the system noise figure and bandwidth. The chart opposite assumes the TC7010 transmitter, TVC4G GaAsfet downconverter or TC7010 connected to a good TV set with 3 MHz IF bandwidth, 3 dB loss in coax at both ends, and snow free defined as a carrier to noise ratio of 40 dB (about 200 microvolts) .

The distances in miles are shown in the order of 10/100 Watts which is the TC7010 by itself or driving a RF Concepts 4110 or Mirage D1010N ATV linear Amplifier. To find the possible DX under line of sight conditions find your antenna gain across the top. Then go down to the receive ends antenna gain. Now read the miles that corresponds to your transmit power level. The distance miles are in the order of 10/100 Watts p.e.p.

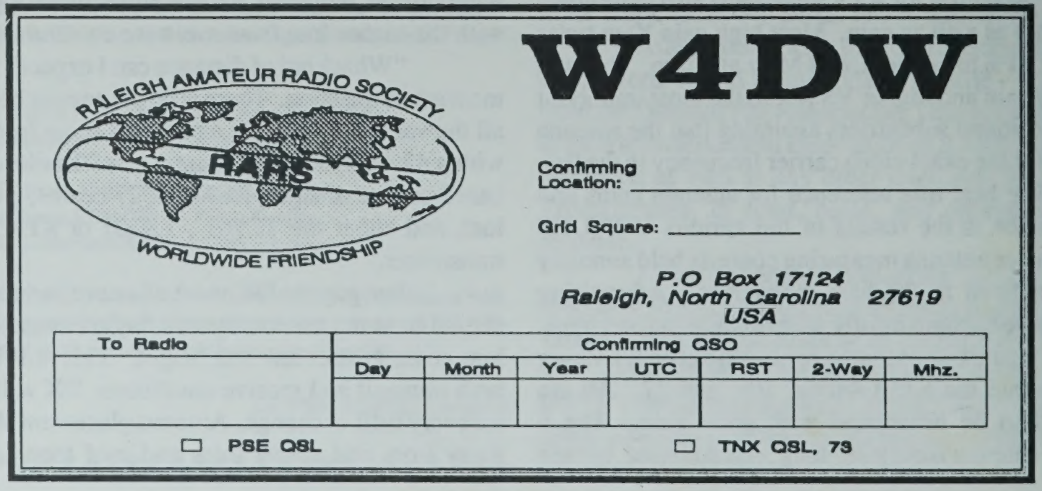
Note #1: 4XL Flexi-Coax is a better choice than 9913 coax. Loss characteristics are the same however, unlike 9913, it has a non-contaminating jacket and a heavier copper shield that is better for "N" connectors.

I plan to continue this article next month and possibly write a monthly technical article on ATV, the development of the Triangle ATV Association, and the ATV repeater. Please let me know if you are interested in seeing these articles continue.

Woody Winstead, KJ4SO

RARS QSL Cards Now Available !

You've seen it on the cover of your Exciter. You've seen it on shirts and banners. Now put it on your QSL cards! Yes, that's right, you can now have the RARS logo, in three beuatiful colors, adorn your QSL cards! The RARS Board of Directors has commisioned WX9X Quality QSL Cards to print 10,000 blank QSL cards with the RARS logo in red, blue, and black, to be placed in the upper-left corner of high quality glossy stock. The rest is yours to customize! Six typestyles and five report forms to choose from to make your card unique! Don't forget your awards, ex-calls, and logos! The cost? RARS is passing this deal on AT COST: 250/$28.50, 500/$35.70, 1000/$49.90. To get these prices RARS had to go in bulk run on the stock, group order, and ship to one address. Mike Ramsey, KD4OKR, has volunteered to handle this project and answer questions (779-2648 before 10pm). Prototypes and order forms will be available at all upcoming meetings. Get in on the first run! Call today!



ATV Antenna Gain vs Distance

Distance miles = 10/100 Watts p.e.p.
Distances shown = line-of-sight conditions

Transmit Ant. Gain / Receive Ant. Gain	0 dBd	4 dBd	9 dBd	15.8 dBd
0 dBd	2.5/8	3.518	7/22	15/47
4 dBd	3.5/11	6/19	11/34	23/175
9 dBd	7/22	11/34	19/60	42/130
15.8 dBd	15/47	23/75	42/130	91/290

The purpose of the DX chart is to enable you to better figure what is needed in your system to have the best chance of getting good pictures where you want them. This is especially important to repeater owners or those setting up for a public service event to figure the expected area of coverage. The DB Products DB420 a popular high gain broadband omni exposed dipole vertical used at single antenna/duplexer inband repeaters, or two Diamond F718x antennas with >20 ft separation is also used. If a repeater is running 80 Watts to a DB420 or F718, it could be snowfree to a station 54 miles away using just a 4406X beam. The distance will double or half with each 6 dB change. For instance if you mounted a Mirage KP2 GaAsfet preamp at the antenna to save the 3 dB coax loss and went to dual beams for 3 more dB gain, you would be able to see a station of the same power and antenna at the same picture to noise ratio twice as far away. The 3 dB more gain from dual beams puts your transmit DX 1.4 times farther.

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TRIANGLE ATV ASSOCIATION

Become a charter member and help make it happen.
January 14, 6:30 p.m. at Darryl's Restaurant
Hwy. 70W (1 or 2 miles west of Crabtree Valley)

ANOTHER AUTOPATCH LECTURE

Well, Station "X" is probably pretty upset with me. Maybe more than a little confused, too. Autopatch — the Devil's phone line!

I'll tell you what happened in a minute. First, here are the RULES...

WHAT SAYS YOU CAN'T:

97.113 Prohibited Communications

(a) No amateur station shall transmit any communication the purpose of which is to facilitate the business or commercial affairs of any party. (More details below...)

WHAT SAYS YOU CAN:

97.403 Safety of life and protection of property.

No provision of these rules prevents the use by an amateur station of any means of radiocommunication at its disposal to provide essential communication needs in connection with the immediate safety of human life and immediate protection of property when normal communication systems are not available.

Practical application time: Station "X" was driving a rented truck for business. The truck died on the highway, not near a phone. The rental agency had the means to get the truck going again quickly. Could the patch be used to make the call?

The RARS .64 Control Operator's opinion was yes. A person in a disabled vehicle is in danger of being hit — especially if they walk along the highway to find a phone. The call was made, and the service rendered. So far, so good.

The truck made it only a few miles and died again. A second call was placed to dispatch help. Before that help arrived, the first mechanic arrived on the scene and got the truck going again.

Not wanting to have a second mechanic waste a trip, station "X" called the agent to cancel the help. And got busted by the Control Op, the KiloHertz Kop. Why?

While the call was full of good intentions, the situation was not an emergency anymore. The truck was rolling down the road (potentially to a pay phone). The exception to "business" communications was no longer in effect.

How about this one: You're heading out to pay a call on a customer, and you get lost. Can you call your secretary and have him give you directions?

Geez, Louise! It may be trivial business, but it is BUSINESS. Oh... you say your boss will KILL you if you blow the account? Well, that's different...

And then we heard something like this on .64: "I can't make an autopatch call and place the order, because that would be business. Could you call them for me?"

OK, wise-guy Control-Cop, what's the matter with THAT?

(Stand back a bit, son, you're crowding my personal space.) This is too easy! Look again at 97.113 (a). It doesn't say business is prohibited just "on an autopatch." It just says NO. No business of ANY party. It doesn't matter if your friend placed the order on the phone or in person. Two out of three parties had a business interest in the communication.

And now, because I already have it on disk and don't have to retype it... here's some more governmentese on what "business" is...from "The FCC Rule Book,"

In an Order dated June 29, 1983, the FCC stated that the term "business," in this instance, is used in the broadest context. It includes all types of communications which are intended to facilitate the regular business or commercial affairs of any party, whether individual or organization, whether for-profit or not-for-profit, whether charitable or commercial, and whether government or non-government. By Public Notice titled "Amateur Service International Radiocommunications" dated September 1, 1989, the FCC further elaborated upon the scope of the rules prohibiting business communications: All types of communications related to business activities, including the advertising, soliciting, ordering, furnishing, delivering, accounting or billing of any supplies, materials, or services are prohibited.

Lest we seem TOO strict, if you read any ARRL instructions on autopatch, they'll tell you your call must be Important, not trivial (like calling your wife to tell her you've just left the office — hey, why didn't you call from the office?). Well, we're not that tight. The patch is fun and convenient for personal calls, and darned handy in an emergency. Call all you want... we'll make more. But not business!

Gary Pearce, KN4AQ

SKYWARN ACTIVE IN WINTER, TOO

This article would have begun "We don't have a lot of tornadoes in the winter...", but the Orange and Johnston County tornadoes in November come to mind (OK that was really fall, but let's not get technical).

The National Weather Service does look to ham radio through SKYWARN in the winter to fill out their picture of area weather. They'll use our information to help specify winter storm watches and warnings.

The conditions that generate a WINTER STORM WARNING are:

4 inches or more of snow
1/2 inch or more of sleet
1/4 inch or more of ice

A WINTER STORM WARNING will be issued if those conditions are expected within 12 hours. A WINTER STORM WATCH will be issued 12 to 36 hours before expected conditions, and a WINTER STORM OUTLOOK is issued more than 36 hours ahead.

Once a storm starts moving into the area, SKYWARN may be activated to relay reports of actual conditions to the NWS. Our reports may, for example, change a watch to a warning.

During icing, the NWS is particularly interested in locating the "freeze" line as it moves across the area — where is precipitation on the roads just wet, and where is it turning to ice?

Activity on winter SKYWARN nets usually isn't "hot and heavy." If you're traveling across the area in a winter storm, the net can be a comforting place to be. The net control stations will be able to help you with any emergency traffic, in addition to weather condition reports.

So tune in to 146.88 to see if SKYWARN is active (we broadcast the message "Check Weather Net on Eight-Eight" on the .64 repeater) as a storm moves in.

For more information on SKYWARN, contact Jerry Stuckle AI0K, at 870-7005. Jerry can also be found on the 147.15 repeater.

RARS MEMBERS HELP ORANGE COUNTY HAMS FOLLOWING NOVEMBER TORNADO

A lot of people said the weather reminded them of that weekend after Thanksgiving in '89, but this year was different. When the tornadoes hit Raleigh in '89, it was a complete surprise — no watches or warnings had been issued, and NWS radar couldn't pick out a storm brewing right over it's antenna.

This year, the tornadoes hit the weekend before Thanksgiving. SKYWARN had been on the air all night, and the NWS had tornado watches in effect for hours. When the tornadoes hit the Hillsboro area, hams were on the scene quickly.

The joke going around a new club, "OCRA" (Orange County Radio Amateurs), is that they haven't had any time to prepare for emergencies — they've been too busy handling them. A major fire in Chapel Hill earlier last year, and then the tornado, have kept club members busy (nope, I'm not going to use the expression "trial by...").

The tornado hit literally under the 147.225 repeater, and while the repeater wasn't damaged, power was knocked out for several hours — not only to the ham repeater, but to police, fire and EMS radios on the hill as well. The Durham FM Assn, which owns the repeater, has plans for backup power, but it hasn't been installed yet.

With distance between the damage sites, the

shelters and the EOC too great for simplex, OCRA hams used the "crossband repeater" capabilities of several dual-band mobiles to bridge the gap until the repeater could be brought on-line. Hams assisted rescue and recovery crews in the early hours after the disaster.

For the next several days, our mission was to assist the Red Cross. The OCRA hams were getting tired — long days with little sleep. Several RARS members helped fill in. We provided communications between the shelter at the Orange County High School and the "ERV" (Emergency Response Vehicle). In this situation, the ERV was basically a "meals on wheels" service for recovery crews.

I hesitate to mention names, because I don't have a complete list — especially the OCRA members. But I do want to point out Sam KD4NMH, who was driving down I-40 just as the tornado went overhead. Sam joined the communications effort from the beginning and stayed through the end. I rode out on the ERV with him to videotape the hams and Red Cross in action. There wasn't much radio traffic, so Sam pitched in helping prepare and serve the food. Rick KA3PSK helped out on Monday, and Paul NO0T and his daughter Laura KD4OZC pitched in on Tuesday. If I missed anybody, I apologize.

Although hams didn't get any press coverage, we did get some excellent "official" recognition. Congressman David Price (a co-sponsor of the "frequency protection act) toured the shelter and was briefed on the Amateur Radio participation.

Special congratulations to the OCRA members who have jumped into public service in a big way during their club's first year !

Gary Pearce, KN4AQ

147.48 — RARS SIMPLEX

USE IT OR LOSE IT?

Did you hear the packet bursts on 147.48 last month?

If you use packet or the RARS telephone BBS, you've seen some discussion about this. For those of you committed to paper, here's what's been happening:

At the November Skywarn Net Control meeting, John KB4WGA mentioned to me that he and some Durham hams were putting up a new packet node. I asked what frequency... and he said they had been putting out a beacon, sending his call in packet and MCW on 147.48 for a couple weeks, and nobody had complained. So that's what they thought they would use.

They wanted something in the high end of 2-meters for the same reason the K4IWW-2 BBS is up high — they will run a "dual port" system, able to commmunicate with "users" up high in the band, and other nodes on 145.01. That means two 2-meter radios operating in close physical proximity. The farther apart in frequency you get, the better that works.

Of course, I told John about RARS' use of 147.48 for simplex. Our use there has caught on pretty well. I'd say more than 80% of the "QSY's to simplex" from .64 go to .48 rather than .52. And at a hamfest you can find RARS folks on .48. The Durham hams have since gone on to use 147.54, along with many other BBSs in the area. But the incident raises some important points and will keep coming up in the future.

I'm a novice at digital (I guess I won't be able to use that excuse for ignorance too much longer, but I'll hold onto it while I can). I've been reading a lot about it, and for a few months now trying it out on the air (VHF Packet, that is). For an information junkie like me, it's great! Ham radio's never had a faster, easier method of distributing lots of information quickly across a wide area. And it's fun! The teletype people have known for years that typing to someone is different than talking to them. But teletype never caught on like Packet. The old machines were big, complicated and noisy. I suppose computers might have just replaced the old RTTY machines, and continued to run BAUDOT RTTY, but Packet is faster and more accurate. And its getting big.

"Big" on ham radio means you chew up spectrum. That's what happened when 2-Meter FM repeaters got "big." A sleepy 'ol band with a handfull of users went BOOM! Now its the most popular Amateur band. But that happened with a lot of pain and work, because first it grew, and second, we planned for it. Wrong order, but who knew how big it would become (after all, the "real" hams LAUGHED at us 2-Meter FM types in the early days).

Well, we're doing it again, this time with Packet. OK, nobody's laughing — packet is clearly a legitimate

mode. But the planning is lagging the growth.

Fortunately for Packet, there were a few gaps left in the 2-Meter Band Plan in the late 70s. The new repeater sub-band, 144.5 - 145.5, forced the SSB operators to move to the low end of the band. The space between 144.9 and 145.1 was kind of a "no man's land," available to any SSB holdouts, or maybe some FM simplex. Nobody really used it. SSB operators realized they were better off at 144 and all activity quickly switched.

Well, I went into a ham-radio nap from 1980 to 1990, and when I awoke, packet had filled that gap, plus another "empty" space from 145.5 to 145.7. And that was good. Except for a conflict with the important but infrequent Space Shuttle operations on 144.95/145.55, packet slipped in before the last 2-meter door closed. Band-plan wise, 2-Meters is now FULL.

Only that's not all the space packet needs. If might be, except for this "dual-port" problem. Packet users (nationwide?) use 145.01 as a kind of "backbone" frequency. Local BBSs and nodes talk to you the user on a different frequency, and then distribute and relay messages via the "backbone." So they use two channels, and need two radios. Those two radios would interfere with each other if they aren't separated. Get the antennas as far apart as possible, and keep the frequencies as far apart as possible.

The farthest you can get from 145.01 is the 147.5-147.6 area (the channels above 147.6 are repeater inputs). So that's where some LANs (Local Area Networks — the things you use from your home packet station) are showing up.

Is that OK? No, its not. The arguments against it get pretty philosophical, but as time goes on, they'll get very real. An image forms in my mind of PACetMAN. You know, the little yellow circle with the big mouth that gobbles up everything on the screen. How big will packet get? How much more spectrum will it need? Will all that be on 2-Meters.

I talked to Will, K4IWW, who runs the oldest and busiest packet BBS in the area — on 147.54. Frequency separation was only one reason he chose that channel. Will (and Ronnie WA4MJF) tell me that in the olden days (early '80s) that channel was used for FM RTTY. Bill K4BWC had a teletype bulletin board of sorts there (maybe he'll read this and decide to write a story about it). The history is murky and a bit contradictory here, but RTTY activity waned, packet began, and Will put his first PBBS on .54 in 1983. Activity on the channel grew.

It's not a local phenomenon. I've heard packet bursts in that part of the band while mobile across Tennessee and Kentucky. But I haven't read about other use in QST. Have you?

It appears to me that the packet pioneers have concentrated on the digital aspect of packet, with less thought of the RF aspect. As a jealous guardian of FM voice (repeater and simplex), and a newly interested packeteer, I view packet's RF expansion with caution.

There is a better way, but it won't be easy. The 20 packet channels at 145 and 145.5 might be enough for local users, if the "backbones" moved to 440 and above. Doing that requires coordination, commitment, and MONEY, and all those are in short supply. It will be hard to ask the BBS and node operators to lay out more energy and money, but with users help, they should. The usability of the packet system is at stake.

Coordination is underway, but interest seems limited. The SERA, which coordinated repeaters, has declined to offer coordination to packet (although they have offered space in their magazine to publicize other's efforts). A new organization formed in Western NC, and fledgling efforts at coordination are beginning elsewhere. I'm hardly an expert at this, but its taken a lot of looking and asking to get the little information I do have.

Is it time for RARS to take a more active, leadership position in packet? Should we use our club's financial and technical resources to help establish packet's UHF Backbone? If so, it will only happen if our members interested in packet want to make it happen. Do you?

Gary Pearce, KN4AQ

Thanks Gary - 3 Fine Articles - I don't know what I'd do without you - Mike, KN4BS

What is Crossband Repeating?

Part One of Two by Errol Casey, KD4IHW

"Hey, guys can you hear .64 on 147.48?" This was a question asked recently during an 8 O'clock RARS net. A few people in the west Raleigh area could hear 146.64 on 147.48 as well as they could on 146.64. Some speculated and at least one suggested that someone was crossband repeating .64. Well crossband repeating was the reason for .64 being heard on 147.48. This crossband repeating was most unusual and was actually a mistake, but an example none the less.

This article was written to help introduce the concept of crossband repeating, since many new radios support the feature and help educate those interested in understanding how it works and can be used.

As the name suggests, crossband repeating is taking a radio signal from one radio band and repeating it onto another. Generally, most amateur radios that have cross band repeat are dual band mobiles (some handie talkies can do it too) that have both 2 meters and 70cm. So this would provide the ability to crossband a 2 meter signal onto 70cm and vice-a-versa. Radio technology continues to move forward, there are even tribanders (such as the Kenwood 741 mobile and Icom's soon to be released tribander handie talkie), which will allow you to choose one of three bands to crossband repeat.

Crossband repeating allows you to do the following things:

- Retransmit a signal that can be heard at one location, but not at another.

- Provide a means to transmit a signal on a frequency that you may not otherwise be able reach because of power and/or antenna constraints.

- Extend the range of one simplex frequency by repeating it onto another frequency which has a longer reaching range.

- Provide emergency linking of simplex or repeater frequencies when necessary.

Crossband repeating involves selecting two frequencies to crossband and setting the radio to crossband mode. The two frequencies which need to be set will be called the "LINK" and a "REPEAT" side frequency. The "LINK" side frequency is where you will listen and talk from a remote location. The "REPEAT" side frequency is the frequency you wish to repeat your signal to. If the frequency being repeated onto is a repeater, the reception of the signal from the repeater should be clear to avoid crossbanding useless noise onto another frequency.

This frequency may be a repeater or just a simplex frequency. The "LINK" frequency should be chosen carefully, I list a few possible simplex frequencies that should be considered. Setting the radio to crossband mode should be described in the owner's manual or can be found by talking with someone else that owns a similar radio.

So why do you want to crossband? Because your radio can crossband? Because you cannot get into a repeater with your handie talkie, but can with your mobile which is parked in the yard? Here are some reasons I found and think are why you may consider crossbanding in the future.

- Crossbanding a repeater onto another frequency can provide the ability to communicate on a repeater, when it would not otherwise be possible. For example, when I'm at home in Fayetteville I crossband the Raleigh 146.88 repeater with my mobile radio. My car is parked in the yard, onto a LINK frequency of 446.200. This allows me to listen to 88 on my dual-band handheld radio and talk to people on 146.88 in Raleigh. I am unable to hear the 146.88 machine on my HT inside the house with an internal antenna (quarter-wave).

- Provide users of one band such as 70cm the ability of listening and/or transmitting on 2 meters with a 440 radio. The person controlling the crossbanding station is be responsible for IDing with his callsign, as normal when it transmitting.

- Extend the range of a simplex frequency. Crossbanding a 440Mhz simplex onto a 2m simplex frequency, would extend the range the 440 frequency when talking to someone on the 2m frequency.

- Crossbanding with multiple radios can allow a repeater to be rebroadcast onto the same band (i.e. 146.64 onto 147.48). This can be used to allow users of 2 meter radios to hear the other frequency locally if they could not heard it otherwise. Caution should be used always when crossband, but especially when multiple radios are used. The incident mentioned at the begin-

ning of the article really should not have occurred as it did.

- Crossbanding can be used to connect repeaters (many need multiple radios), in an emergency to provide "linking" of different areas. There are a number of considerations that should be made when crossband repeating.

o **First,** you need to select a "LINK" frequency (I recommend it be a simplex frequency). The frequency should be monitored to see how busy it is; don't crossband repeat onto a busy simple frequency such as the national calling frequencies (146.52,446.0). Select a frequency that people don't use very often or that people would not mind hearing, what you are going to repeat onto it. Some simplex frequencies that might be used are as follows:

2 meters: 146.55, 146.58, 147.48, etc. excluding the national simplex 146.52

70cm: 446.0-447.0, excluding 446.0 the 70cm national simplex and 446.5 which is a nationally used packet backbone frequency I personally use 446.200 with a tone squelch of 100.0

o **Second,** whatever is transmitted onto the "LINK" frequency that you select will be retransmitted onto the "REPEAT" frequency that you are transmitting to. So care should be taken into avoid unwanted signals being repeated. Squelch can be used to avoid most unwanted signals. Normal squelch should be adjusted to allow only strong signals to come through, and tone squelch can add even more protection from unwanted signals. Using tone squelch will only allow signals coming in with a specific tone to be repeated. (See Gary Pearce's, KN4AQ article on Tone Squelch in a previous EXCITER). These techniques helps prevent problems with intermod signals being retransmitted. Note: If tone squelch is used, others that want to use the crossband repeater will have to know the tone. Which bring up the point of is crossband repeating a "personal" device or something for general use? My view is, if you are interested in using the crossband repeater ask the personal crossbanding for the tone, it's up to the operator of the radio to provide you with the necessary tone.

o **Third,** What are you going to repeat. Step two discusses the considerations needed for setting the "LINK" frequency. Now you should select the "REPEAT" frequency. The first thought is, I want to crossband a repeater. Or at least this was my first thought. Crossband works great for repeating a repeater, but you should realize that you may be limited by the repeater you are crossband repeating. Most repeaters have a "hang time", during which the keep their carrier on the air. This "hang time" is retransmitted by the crossband repeater as well, which means you cannot transmit until the carrier drops. On a busy repeater, this means you many never get to say ANYTHING. So, when you crossband a repeater, id and make a comment that you are crossbanding it. Others reading this article, but who cannot crossband should make note of this fact. Be considerate and let crossbanders participate in conversations. The letting the carrier drop, resets the repeater's timer and allow for any emergency traffic to get in easier. I realize that the conversations get drawn out when you do this also, but it probably will not happen that often. If you want to join in on a conversation, once you get into the conversation; let the others know that they have to let the repeater drop it's carrier before you can respond. Otherwise, you will be orphaned and will have to set back and let everybody else talk. One disadvantage of busy repeaters and people that talk for a long time :-)

o **Last,** identify yourself as normal but also notify others that you ar crossbanding. Some people, will not understand what "crossbanding" means, so you will have an opportunity to share your knowledge and tell them that you cannot talk until the repeater drops the carrier, therefore avoiding getting cut out of conversations. Identifying the fact that you are crossbanding will also, prevent confusion of others thinking that something is wrong with their radio. If you would like you can indicate both the frequency and tone that you are crossbanding onto, so maybe others in your area can take advantage of the cross banding. Remember, you generally crossband a frequency that you cannot get into easily without crossbanding, so others can probably appreciate and use your crossband frequency.

Part Two of "What is Crossbanding?" will discuss how crossbanding can be used to get into repeaters that you can hear on your dual-band handheld, but cannot transmit into (because of antenna and/or power) and how to prevent getting stray signals transmitted back onto your LINK frequency.

Errol Casey, KD4IHW can be reached at (919) 380-0412 or on his BBS The Backdoor at (919) 460-7903.

HAMFEST INFO 1993

By John Covington WN4BBJ

Upcoming events:

GREENWOOD SC HAMFEST

The Greenwood Hamfest will be held from 9:00 am to 3:00 pm on Saturday, January 16th, 1993 at the Greenwood Civic Center on Highway 72 East. This event is sponsored by the Greenwood Amateur Radio Society. Talk-in is on 147.165/.765 repeater.

Tickets $4 in advance, $5 at the door. Tables are $5. Send preregistration requests to: Eldora Keck, 152 Cherokee Drive, Greenwood SC 29646 (803-229-3676)

For more information, call or write: Earl Gillian K4VIA, 405 Draper Street, Greenwood SC 29646 (803-223-4436) or Jack Wheless, 141 Cherokee Drive, Greenwood SC 29646 (803-299-3176)

Walk-in VE Exams will be offered at 10:00 AM. Refreshments are available. This is a small-to-medium sized event, all indoors. Last year they reportedly had about 1100 people attend.

RICHMOND VA FROSTFEST

The 16th Annual Richmond Frostfest will be held Sunday, January 17, 1993 at The Showplace, 3000 Mechanicsville Turnpike, Richmond VA from 8:30 am to 3:30 pm. This event is sponsored by the Richmond Amateur Telecommunications Society (RATS).

Talk-in is on the 146.88 and 145.43 repeaters. Tickets are $5, Flea market tables are $15, electrical hookups for flea market tables $5. Send ticket requests with check to: Richmond Frostfest, PO Box 6673, Glen Allen, VA 23058

All table requests and advance ticket sales must be received by December 30th. Any unsold spaces will be available on the day of the show. Setup will be on Saturday from 12 Noon to 8 PM and Sunday from 6 AM to 8 AM. For more information about tickets and reservations, call: Mark Huff, WA4DHY, 804-747-0227 evenings 7-10 pm, Mon-Thurs. For Other hamfest information, call: Bill Mason, AB3P, Frostfest Chairman, (804) 745-5822, evenings only. Exams will be offered on Saturday, January 16th at 7:00 pm. NO walk-ins. For exam info or registration, call: Bill Mason AB3P, 804-745-5822, evenings only.

This hamfest is a medium-sized event, and all of it is indoors. This event is well-attended by ham radio and computer dealers. I have been there several times when it was at the Virginia Fairgrounds and enjoyed it.

GASTONIA HAMFEST

The first annual Gastonia Hamfest will be held Sunday January 23rd from 8 AM to 4 PM at the NC National Guard Armory on 2100 Robinwood Road in Gastonia. This event is sponsored by the Gastonia Area Amateur Radio Club. Talk-in will be on the 146.805 and 444.15 repeaters.

Admission will be $4 and includes one tailgate space. Inside tables are $7 each plus admission fee. There will be no preregistration of tickets or tables.

For more information contact: Biil Shogran, WB4TSW, 704-732-1005 or Glen Varner, W4PBQ, 704-865-4881

1993 Carolinas Hamfest List; revised 12/19/92

All events are in North Carolina unless otherwise indicated. Dates below are subject to change. Dates marked with an asterisk are unconfirmed and are based on dates from previous years or from tentative dates published in the SERA Repeater Journal and QST.

Jan 16 (Sat):	Greenwood SC Hamfest
Jan 17 (Sun):	Richmond VA Frostfest
Jan 23 (Sat):	Gastonia Hamfest
Feb 14 (Sun):	Elkin Hamfest
Feb 20 (Sat):	Charleston SC Hamfest
Mar 13-14 (Sat-Sun):	Charlotte Hamfest
Mar 26-27 (Fri-Sat):	Antique Wireless SE Region, Monroe
Mar 28 (Sun):	Down East Hamfest, Kinston
Apr 4 (Sun):	Raleigh Hamfest
May 1-2 (Sat-Sun):	Greenville SC Hamfest
May 15 (Sun):	Roanoke VA Hamfest
May 29 (Sat):	Durham Hamfest
*June 12 (Sat):	Winston-Salem Hamfest
July 10 (Sat):	Salisbury Hamfest
July 17 (Sat):	Cary Hamfest
July 17-18 (Sat-Sun):	Atlanta GA Hamfest
Jul 24-25 (Sat-Sun):	Asheville Hamfest
*Aug 7-8 (Sat-Sun):	High Point Hamfest
*Aug 21 (Sat):	Spruce Pine Hamfest
Sep 4-5 (Sat-Sun):	Shelby Hamfest
*Sep 25 (Sat):	Danville/S. Boston Hamfest
*Oct 2 (Sat):	Rock Hill SC Hamfest
*Oct 9 (Sat):	Augusta GA Hamfest
*Oct 10 (Sun):	Maysville Hamfest
*Oct 16 (Sat):	Tri-Cities TN Hamfest
*Oct 17 (Sun):	Triangle East ARA Hamfest, Selma
*Oct 23 (Sat):	Sumter SC Hamfest
*Oct 30 (Sat):	Forest City/Rutherfordton Hamfest
*Nov 7 (Sun):	Concord Hamfest
Nov 13 (Sat):	Myrtle Beach SC Hamfest
*Nov 14 (Sun):	Benson Hamfest
*Nov 27-28 (Sat-Sun):	Greensboro Hamfest

John Covington, WN4BBJ

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RARS Calendar of Events January 1993

Jan 6	RARS regular meeting, YMCA 7:30PM
Jan 9	Exams, Durham, contact: Pete KY4Y, 544-3215
Jan 13	RARS VHF/UHF SIG, info: Woody, KJ4SO 848-1844
Jan 14	**Triangle TV Assoc. Charter Meeting,** Darryls Hwy 70, 6:30PM see page 4,
Jan 17	Richmond, VA Frostfest
Jan 18	RARS SWL/Scanner SIG, info: Kurt, KD4YU, 772-0207
Jan 20	RARS Board Meeting, 7pm, YMCA
Jan 20	RARS DX SIG, contact: Paul, NO0T. 847-8830
Jan 23-4	ARRL VHF/UHF QSO Party, RARS contact: Dave, K4SAN
Jan 27	RARS Homebrew SIG, contact: Bob N4AG 847-0069
Jan 28	RARS Crystals meet at Shoneys, Avent Ferry Rd 6:30
Jan 29-30	CQ WW 160 Meter Contest
Jan 30	ARRL Novice Roundup starts - till Feb 8th. See QST
Feb 3	RARS regular meeting, YMCA 7:30PM with exams, contact AA4MY, Vince 847-8512 for pre-registration.
Feb 10	RARS VHF/UHF SIG, info: Woody, KJ4SO 848-1844
Feb 17	RARS Board Meeting, 7pm, YMCA
Feb 23	RARS Crystals meet at Shoneys, Avent Ferry Rd 6:30
Mar 13	Exams, Durham, contact: Pete KY4Y, 544-3215